

Grain-Scale Simulation of Shock Response in PZT Ceramics

B.G. Potter, J.B. Aidun, R.M. Brannon, J. Robbins, K.H. Brown
Sandia National Laboratories

The performance of PZT ceramics in shock-actuated power supply applications is significantly influenced by the microstructure of the ceramic body. A grain-scale, finite element simulation capability is being developed to relate PZT ceramic microstructure to its associated ferroelectric behavior under the influence of an impressed compressive stress wave. The aim is to apply this simulation capability to guide selection of manufacturing process steps for the PZT ceramic and to guide enhancements to a macroscale, homogeneous ceramic material model. Results of transient dynamic and newly implemented static stress simulations will be discussed in the context of experimental findings and validation of the approach.

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